

CLAIMS:

1. A compressor with a lubrication structure,  
comprising:

5 a rotary shaft;

a piston;

a driving body accommodating chamber;

a driving body accommodated in the driving body  
accommodating chamber, wherein the driving body converts  
10 rotation of the rotary shaft into reciprocation of the piston,  
thereby causing the piston to compress gas;

a gas passage that extends through the rotary shaft and  
communicates with the driving body accommodating chamber,  
wherein the gas passage includes an expansion portion; and

15 a fluid passage that extends through the rotary shaft to  
connect the expansion portion with the driving body  
accommodation chamber,

wherein the maximum cross-sectional area of the  
expansion portion is greater than the maximum cross-sectional  
20 area of a section of the gas passage that is upstream of the  
expansion portion.

2. The compressor according to claim 1, wherein the  
fluid passage extends in a radial direction with respect to  
25 an axis of the rotary shaft.

3. The compressor according to claim 1, wherein the  
cross-sectional area of the expansion portion gradually  
increases from an upstream end toward a downstream end.

30 4. The compressor according to claim 1, further  
comprising:

a discharge pressure zone, the internal pressure of  
which is discharge pressure;

35 a suction pressure zone, the internal pressure of which

is suction pressure;

a feed passage connecting the discharge pressure zone with the driving body accommodating chamber; and

a bleed passage connecting the driving body

5 accommodating chamber with the suction pressure zone,

wherein the bleed passage functions as the gas passage, wherein the pressure in the driving body accommodating chamber is adjusted by supplying gas in the discharge pressure zone to the driving body accommodating chamber through the feed passage, and bleeding gas in the driving  
10 body accommodating chamber to the suction pressure zone through the bleed passage, and wherein a displacement of the compressor is controlled according to the pressure in the driving body accommodating chamber.

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5. The compressor according to claim 4, further comprising a plurality of cylinder bores arranged around an axis of the rotary shaft, wherein the piston is one of a plurality of pistons each of which is accommodated in one of  
20 the cylinder bores, each piston defining a compression chamber in the associated cylinder bore, wherein the compressor further comprises a rotary valve that has an inlet passage for drawing gas from the suction pressure zone to the compression chambers, wherein the rotary valve includes a  
25 supply passage connecting the inlet passage with the suction pressure zone, and wherein the expansion portion communicates with the supply passage through a restriction passage.

6. The compressor according to claim 5, wherein the  
30 rotary valve is coupled to the rotary shaft to integrally rotate with the rotary shaft.

7. The compressor according to claim 6, wherein the restriction passage is located in the rotary valve.

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8. The compressor according to claim 7, wherein the rotary shaft has one end at which the expansion portion opens, and the rotary valve has one end at which the restriction passage opens, and wherein the one end of the rotary valve is fitted to the one end of the rotary shaft.

9. The compressor according to claim 5, wherein the rotary valve is a part of the rotary shaft, and wherein a shutter having the restriction passage is located in the rotary shaft.

10. The compressor according to claim 5, wherein the restriction passage and the supply passage function as the bleed passage.

11. The compressor according to claim 5, wherein the restriction passage is located on the axis of the rotary valve.

12. The compressor according to claim 1, wherein the gas is a refrigerant containing lubricating oil.

13. A compressor with a lubrication structure, comprising:

- a rotary shaft;
- a piston;
- a swash plate chamber;
- a swash plate that is accommodated in the swash plate chamber and supported on the rotary shaft, wherein the swash plate converts rotation of the rotary shaft into reciprocation of the piston, thereby causing the piston to compress refrigerant, the refrigerant containing lubricating oil;

- a refrigerant passage extending through the rotary shaft, wherein the refrigerant passage includes an inlet, which

communicates with the swash plate chamber, and an expansion portion; and

a fluid passage that formed in the rotary shaft in a radial direction to connect the expansion portion with the swash plate chamber,

wherein the maximum cross-sectional area of the expansion portion is greater than the maximum cross-sectional area of a section of the refrigerant passage that is upstream of the expansion portion.

14. The compressor according to claim 13, wherein the cross-sectional area of the expansion portion gradually increases from an upstream end toward a downstream end.

15. The compressor according to claim 13, further comprising:

a discharge pressure zone, the internal pressure of which is discharge pressure;

a suction pressure zone, the internal pressure of which is suction pressure;

a feed passage connecting the discharge pressure zone with the swash plate chamber; and

a bleed passage connecting the swash plate chamber with the suction pressure zone,

wherein the bleed passage functions as the refrigerant passage, wherein the pressure in the swash plate chamber is adjusted by supplying refrigerant in the discharge pressure zone to the swash plate chamber through the feed passage, and bleeding refrigerant in the swash plate chamber to the suction pressure zone through the bleed passage, and wherein a displacement of the compressor is controlled according to the pressure in the swash plate chamber.

16. The compressor according to claim 13, further comprising a plurality of cylinder bores arranged around an

axis of the rotary shaft, wherein the piston is one of a plurality of pistons each of which is accommodated in one of the cylinder bores, each piston defining a compression chamber in the associated cylinder bore, wherein the  
5 compressor further comprises a rotary valve that has an inlet passage for drawing refrigerant from the suction pressure zone to the compression chambers, wherein the rotary valve includes a supply passage connecting the inlet passage with the suction pressure zone, and wherein the expansion portion  
10 communicates with the supply passage through a restriction passage.

17. The compressor according to claim 16, wherein the rotary valve is coupled to the rotary shaft to integrally  
15 rotate with the rotary shaft.

18. The compressor according to claim 17, wherein the restriction passage is located in the rotary valve.

20 19. The compressor according to claim 18, wherein the rotary shaft has one end at which the expansion portion opens, and the rotary valve has one end at which the restriction passage opens, and wherein the one end of the rotary valve is fitted to the one end of the rotary shaft.

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20. The compressor according to claim 16, wherein the rotary valve is a part of the rotary shaft, and wherein a shutter having the restriction passage is located in the rotary shaft.